

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

D103

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>A61K 7/00</b>		<b>A2</b>	(11) International Publication Number: <b>WO 99/39682</b>
			(43) International Publication Date: 12 August 1999 (12.08.99)
(21) International Application Number: <b>PCT/EP99/00685</b>		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: <b>2 February 1999 (02.02.99)</b>			
(30) Priority Data: <b>198 04 376.7      4 February 1998 (04.02.98)      DE</b>			
(71) Applicant (for all designated States except US): <b>JOHNSON &amp; JOHNSON GMBH [DE/DE]; Kaiserswerter Strasse 270, D-40474 Düsseldorf (DE).</b>			
(72) Inventors; and (75) Inventors/Applicants (for US only): <b>FERNANDEZ-KLEINLEIN, Elena [ES/DE]; Kaiser-Karl-Ring 38B, D-53111 Bonn (DE). HAUSER, Matthias [DE/DE]; Johann-Luetz-Strasse 10, D-53639 Koenigswinter (DE). VON STETTEN, Otto [DE/DE]; An der Weingass 19, D-52072 Aachen (DE).</b>			
(74) Agents: <b>GROENING, Hans, W. et al.; Boehmert &amp; Boehmert, Franz-Joseph-Strasse 38, D-80801 München (DE).</b>			
<b>Published</b> <i>Without international search report and to be republished upon receipt of that report.</i>			
(54) Title: <b>LIPID MIXTURES AND THEIR USE</b>			
(57) Abstract <p>Lipid mixture having a physiologically effective content of polyunsaturated fatty acids and/or derivatives thereof, having a physiologically effective content of modified coconut oil which essentially comprises C10-C14 fatty acids in the form of mono-, di- and triglycerides and has a cloud point of &lt; 5 °C, and the use thereof as or in a cosmetic or pharmaceutical preparation.</p>			

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

### Lipid mixtures and their use

The invention relates to lipid mixtures having a physiologically effective amount of polyunsaturated fatty acids and/or derivatives thereof and also to their use as such or in cosmetic or pharmaceutical preparations for topical application to the skin.

The principal task of topically applied lipids, in the cosmetic or pharmaceutical field, is to enhance the barrier function, i.e. the protection function, of the skin and thus to prevent it from drying out or to prevent the entry of foreign substances. They also serve to improve the suppleness of the skin, the condition of its surface and its appearance. Moreover, substances present particularly in natural lipids, e.g. saturated and unsaturated fatty acids, lecithins, ceramides, etc., play an important role in physiological processes, e.g. metabolism, irritation, inflammation, allergic reactions, etc.

The barrier function is often enhanced by using occlusive substances, e.g. paraffin oil and vaseline, which, although preventing the skin from drying out to a certain degree, are not, however, able to contribute to the physiological processes in the skin. Furthermore, their use is cosmetically unacceptable since they have poor spreadability and poor absorption and impart a greasy feel to the skin.

Natural lipids are able, depending on the composition, to influence skin physiology, but they are more difficult to spread than the specified occlusive substances, cannot be distributed particularly well and are absorbed more slowly than, for example, paraffin oil.

US-A-5,445,822 describes a cosmetic composition comprising triglycerides containing from 40 to 70% of oleic acid, from 30 to 50% of polyunsaturated fatty acids, from 0.2 to 1% of  $\gamma$ -linolenic acid and from 1 to 5% of  $\alpha$ -linolenic fatty acid, the ratio of n-6 fatty

acids to n-3 fatty acids being from 10:1 to 30:1. There is no mention of the application properties, nor is there a further explanation as to the physiological effects of the composition.

5           The object of the present invention is to provide lipid mixtures which contribute to improving the aforementioned application properties at the same time as improving the physiological condition of the skin.

10           According to the invention, the object is achieved by a generic lipid mixture having an effective content of modified coconut oil, which essentially comprises C10 - C14 fatty acids in the form of mono-, di- and triglycerides and has a cloud point of  $< 5^{\circ}\text{C}$ .

15           Preference is given to a lipid mixture in which the modified coconut oil is present in a concentration of from 5 to 40%, preferably from 10 to 30%, particularly preferably from 15 to 25%, based on the total weight of the lipid mixture.

20           The polyunsaturated fatty acids advantageously comprise linoleic acid and  $\alpha$ -linolenic acid.

          It is intended that the ratio of linoleic acid to  $\alpha$ -linolenic acid, in percent by weight, is between 15:1 and 5:1, preferably between 13:1 and 7:1, particularly preferably between 11:1 and 9:1.

25           It is intended that the polyunsaturated fatty acids are essentially present in the form of their triglycerides.

          Natural triglycerides having a high content of polyunsaturated fatty acids are advantageously present.

30           According to a particular embodiment of the invention, the polyunsaturated fatty acids are prepared using soybean oil, sunflower oil, wheat germ oil, linseed oil, thistle oil, China oil, grapeseed oil, sesame oil or mixtures thereof.

35           It is advantageous to use a mixture of at least two of the specified oils.

          The invention further relates to the use of the lipid mixture according to the invention as such or in a cosmetic preparation.

Finally, the invention also relates to the use of the lipid mixture according to the invention as or in a pharmaceutical preparation for topical application to the skin, in particular for the treatment of dry skin, neurodermatitis, atopic eczema and similar skin conditions.

Surprisingly, it has been found that the lipid mixture according to the invention has better application properties than the known occlusive substances, such as, for example, paraffin oil and vaseline, or individual natural oils, and at the same time contributes to improving the physiological condition of the skin.

An essential component of the lipid mixture according to the invention is a modified coconut oil, which essentially comprises C10-C14 fatty acids in the form of mono-, di- and triglycerides, and has a cloud point of < 5°C. A modified coconut oil of this type is known under the INCI name "cocoglycerides" and is commercially available, for example under the name Myritol 331.

It is advantageously used in a concentration of from 5 to 40%, preferably from 10 to 30% and particularly preferably from 15 to 25%, based on the total weight of the lipid mixture. A direct comparison with the compositions in the aforementioned US-A-5,445,822 has shown that the triglycerides comprising oleic acid mentioned therein do not improve the application properties in this way. Moreover, the oxidation stability of the coconut oil used according to the invention is significantly higher than that of the triglycerides listed in the cited US Patent.

The physiologically effective components used are lipids having a high content of linoleic acid and  $\alpha$ -linolenic acid, where the ratio of linoleic acid to  $\alpha$ -linolenic acid, in percent by weight, is between 15:1 and 5:1, preferably between 13:1 and 7:1 and particularly preferably between 11:1 and 9:1. Linoleic acid and  $\alpha$ -linolenic acid can either be used as such or in the form of their derivatives, e.g. monoesters, triglycerides or

amides, etc.

Triglycerides having a high content of linoleic acid and  $\alpha$ -linolenic acid are present in natural oils, such as, for example, soybean oil, sunflower oil, wheat germ oil, linseed oil, thistle oil, China oil, grapeseed oil or sesame oil. Particular preference is given to soybean oil, sunflower oil, wheat germ oil, linseed oil, thistle oil or China oil, with soybean oil, sunflower oil, wheat germ oil and linseed oil being the most preferred. In particular, it is possible to use mixtures of at least two of the specified oils. In addition,  $\gamma$ -linolenic acid can be added to the lipid mixture as it is or in the form of oils such as starflower oil or evening primrose oil.

It is preferable to add an antioxidant to the lipid mixtures. The antioxidants which are primarily suitable for this purpose are oil-soluble ones, such as, for example, tocopherol, mixtures of different tocopherols, ascorbyl palmitate, BHT, BHA and mixtures thereof, optionally with the addition of synergists, such as lecithin etc. Antioxidants of this type are commercially available, for example under the names OxyneX, Covi-ox T70 or Controx. Furthermore, it is possible to add other auxiliaries or additives, such as, for example, perfume or the like.

The lipid mixtures according to the invention are either used as such, e.g. as body oils for cosmetic or pharmaceutical use, or as oil phases or constituents of oil phases in cosmetic or pharmaceutical preparations, such as, for example, emulsions of the water-in-oil type or of the oil-in-water type, microemulsions, nonaqueous preparations in the form of pastes, sticks, ointments, oil baths, hydrosurfactant preparations such as care shampoo and shower gels, etc. Substances which are customarily used in the formulation of such preparations can be added to the corresponding cosmetic or pharmaceutical preparations. These include, inter alia, emulsifiers, surfactants, emollients, structure formers, etc. Furthermore, it is possible, depending on the

desired use, to incorporate further active substances, e.g. light protection filters, antibacterial substances, antiperspirants, deodorants, etc.

5 The lipid mixtures according to the invention and the cosmetic or pharmaceutical preparations prepared therefrom are notable for excellent absorption, good spreadability and distribution properties and impart an exceptionally good and smooth feel to the skin at the same time as being very well tolerated. They are  
10 suitable, in particular, for use with dry skin, neurodermatitis, atopic eczema or similar skin conditions.

People who suffer from atopic eczema usually avoid oil- and fat-containing skincare products since  
15 such products worsen the condition of the skin rather than improve it. Surprisingly, it has now been found that the lipid mixtures according to the invention in the form of body oils or emulsions are not only very well tolerated by people with atopic eczema but that the disease  
20 phenomena can be reduced and the condition of the skin significantly improved. In an application test using a body oil according to the invention, participants who suffered from atopic eczema reported that the red areas and centres of inflammation disappeared within one week.  
25 People with dry skin reported a significant increase in the elasticity of the skin and a normalizing of the condition of the skin.

The invention is illustrated in more detail below with reference to typical lipid mixtures and products  
30 prepared therefrom. Examples 1 to 6 give lipid mixtures according to the invention which were prepared by thoroughly mixing, by stirring, the individual components in the order given in a stainless steel container.

Example 1:

35	Modified coconut oil	15.00% by weight
	Soybean oil	43.17 % by weight
	Wheat germ oil	41.63 % by weight

Example 2:

	Modified coconut oil	20.00 % by weight
--	----------------------	-------------------

Soybean oil	2.51 % by weight
Sunflower oil	71.89 % by weight
Oxynex K	0.10 % by weight

Example 3:

5	Modified coconut oil	10.39 % by weight
	Sunflower oil	71.34 % by weight
	Linseed oil	6.87 % by weight
	Thistle oil	11.20 % by weight
	Oxynex K	0.10 % by weight
10	Perfume	0.10 % by weight

Example 4:

	Modified coconut oil	19.89 % by weight
	Soybean oil	56.96 % by weight
	Sunflower oil	12.86 % by weight
15	Wheat germ oil	10.00 % by weight
	Oxynex K	0.15 % by weight
	Perfume	0.15 % by weight

Example 5:

	Modified coconut oil	19.86 % by weight
20	Soybean oil	24.86 % by weight
	Sunflower oil	50.08 % by weight
	Linseed oil	5.00 % by weight
	Oxynex K	0.10 % by weight
	Perfume	0.10 % by weight

25 Example 6:

	Modified coconut oil	20.02 % by weight
	Soybean oil	59.10 % by weight
	Sunflower oil	16.68 % by weight
	Wheat germ oil	4.00 % by weight
30	Oxynex K	0.10 % by weight
	Perfume	0.10 % by weight

Example 7:

35 An oil-in-water emulsion was prepared by incorporating the lipid mixture from Example 4 into a solution of Pemulen TR1 in water and propylene glycol. After the other ingredients, which are given the table below, had been added, the mixture was neutralized using sodium hydroxide solution and homogenized.



	Lipid mixture from Ex. 4	46.60 % by weight
	Tocopheryl acetate	0.10 % by weight
	Preservative	1.00 % by weight
	Pemulen TR1	0.35 % by weight
5	Arlacel 83	0.10 % by weight
	Water	50.35 % by weight
	Propylene glycol	1.00 % by weight
	Na hydroxide	0.50 % by weight

10 An oil according to Example 4 was tested by a panel of experts for its application properties compared with paraffin oil and individual natural oils. The properties of spreading and distribution were judged to be significantly better compared with the individual natural oils; the properties of skin smoothness and  
15 absorption were significantly better compared with paraffin oil and the individual natural oils.

The features of the invention disclosed in the description above and the claims may be essential either individually or in any combination for implementing the  
20 invention in its different variants.

## Patent Claims

1. Lipid mixture having a physiologically effective content of polyunsaturated fatty acids and/or derivatives thereof, characterized by an effective content of  
5 modified coconut oil which essentially comprises C10 to C14 fatty acids in the form of mono-, di- and triglycerides and has a cloud point of  $< 5^{\circ}\text{C}$ .
2. Lipid mixture according to Claim 1, characterized in that the modified coconut oil is present in a  
10 concentration of from 5 to 40%, based on the total weight of the lipid mixture.
3. Lipid mixture according to Claim 2, characterized in that the modified coconut oil is present in a concentration of from 10 to 30%, based on the total  
15 weight of the lipid mixture.
4. Lipid mixture according to Claim 3, characterized in that the modified coconut oil is present in a concentration of from 15 to 25%, based on the total weight of the lipid mixture.
- 20 5. Lipid mixture according to Claim 1, characterized in that the polyunsaturated fatty acids are linoleic acid and  $\alpha$ -linolenic acid.
6. Lipid mixture according to Claim 5, characterized in that the ratio of linoleic acid to  $\alpha$ -linolenic acid,  
25 in percent by weight, is between 15:1 and 5:1.
7. Lipid mixture according to Claim 6, characterized in that the ratio of linoleic acid to  $\alpha$ -linolenic acid, in percent by weight, is between 13:1 and 7:1.
8. Lipid mixture according to Claim 7, characterized in that the ratio of linoleic acid to  $\alpha$ -linolenic acid is  
30 between 11:1 and 9:1.
9. Lipid mixture according to one of Claims 4 to 8, characterized in that the polyunsaturated fatty acids are essentially in the form of their triglycerides.
- 35 10. Lipid mixture according to Claim 9, characterized in that natural triglycerides having a high content of polyunsaturated fatty acids are present.
11. Lipid mixture according to Claim 10,

characterized in that the polyunsaturated fatty acids are prepared using soybean oil, sunflower oil, wheat germ oil, linseed oil, thistle oil, China oil, grapeseed oil, sesame oil or mixtures thereof.

- 5 12. Lipid mixture according to Claim 11, characterized in that a mixture of at least two of the specified oils is used.
13. Use of a lipid mixture according to one of the preceding claims as or in a cosmetic preparation.
- 10 14. Use of a lipid mixture according to one of Claims 1 to 12 as or in a pharmaceutical preparation for topical application to the skin.
- 15 15. Use according to Claim 14 for the treatment of dry skin, neurodermatitis, atopic eczema and similar skin conditions.